

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE FORM PTO-1390 (REV 10-2000)		ATTORNEY'S DOCKET NUMBER P/3610-12
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S. APPLICATION NO (If known, see 37 CFR 1.5) <b>09/787631</b>
INTERNATIONAL APPLICATION NO. PCT/FR99/02223	INTERNATIONAL FILING DATE 20 September 1999	PRIORITY DATE CLAIMED 21 September 1998
TITLE OF INVENTION FUNGICIDAL COMPOSITIONS		
APPLICANT(S) FOR DO/EO/US Maurice CHAZALET et al.		
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:		
1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input checked="" type="checkbox"/> This is an express request to promptly begin national examination procedures (35 U.S.C. 371(f)). 4. <input type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (PCT Article 31). 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) a. <input type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau). b. <input checked="" type="checkbox"/> has been communicated by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input checked="" type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)). 7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau). b. <input type="checkbox"/> have been communicated by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input checked="" type="checkbox"/> have not been made and will not be made. 8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). 9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). - unsigned 10. <input checked="" type="checkbox"/> An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). 		
Items 11 to 16 below concern document(s) or information included:		
11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 13. <input checked="" type="checkbox"/> A FIRST preliminary amendment. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. 14. <input type="checkbox"/> A substitute specification. 15. <input type="checkbox"/> A change of power of attorney and/or address letter. 16. <input checked="" type="checkbox"/> Other items or information: EFS print form.		
EXPRESS MAIL CERTIFICATE		
I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail Post Office to Addresses (mail label <u>EL613112978US</u> ) in an envelope addressed to: Asst. Commissioner for Patents, Washington, D.C. 20231, on <u>March 20, 2001</u> .		
<u>Tamika Sumpter</u> Name of Person Mailing Correspondence <u>Tamika Sumpter</u> Signature		
<u>March 20, 2001</u> Date of Signature		

U.S. APPLICATION NO. (if known) 09/87631		INTERNATIONAL APPLICATION NO. PCT/FR99/02223	ATTORNEY'S DOCKET NUMBER P/3610-12																				
17. <input checked="" type="checkbox"/> The following fees are submitted: <b>BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):</b> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO ..... \$1000.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO ..... \$860.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$710.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... \$690.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) ..... \$100.00		CALCULATIONS PTO USE ONLY																					
<b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>		\$ 860.00																					
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).		\$																					
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>CLAIMS</th> <th>NUMBER FILED</th> <th>NUMBER EXTRA</th> <th>RATE</th> </tr> </thead> <tbody> <tr> <td>Total claims</td> <td>18 - 20 =</td> <td>0</td> <td>X \$18.00</td> </tr> <tr> <td>Independent claims</td> <td>2 - 3 =</td> <td>0</td> <td>X \$80.00</td> </tr> <tr> <td colspan="2"><b>MULTIPLE DEPENDENT CLAIM(S) (if applicable)</b></td> <td>0</td> <td>+ \$270.00</td> </tr> <tr> <td colspan="2" style="text-align: right;"><b>TOTAL OF ABOVE CALCULATIONS =</b></td> <td>\$ 860.00</td> <td></td> </tr> </tbody> </table>		CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	Total claims	18 - 20 =	0	X \$18.00	Independent claims	2 - 3 =	0	X \$80.00	<b>MULTIPLE DEPENDENT CLAIM(S) (if applicable)</b>		0	+ \$270.00	<b>TOTAL OF ABOVE CALCULATIONS =</b>		\$ 860.00			
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<b>SUBTOTAL =</b>		\$ 860.00																					
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +		\$																					
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Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +		\$																					
<b>TOTAL FEES ENCLOSED =</b>		\$ 860.00																					
		Amount to be refunded:	\$																				
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a. <input checked="" type="checkbox"/> A check in the amount of \$ 860. to cover the above fees is enclosed. Check No. 3860																							
b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.																							
c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 15-0700. A duplicate copy of this sheet is enclosed.																							
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.																							
SEND ALL CORRESPONDENCE TO: <b>OSTROLENK, FABER, GERB &amp; SOFFEN, LLP</b> <b>1180 Avenue of the Americas</b> <b>New York, NY 10036-8403</b>																							
 SIGNATURE: <b>Edward A. Meilman</b> NAME: <b>24,735</b> REGISTRATION NUMBER																							

09/787631

JC02 Rec'd PCT/PTO 20 MAR 2001  
P/3610-12

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

Maurice CHAZALET et al

Serial No.:

Filed:

For: FUNGICIDAL COMPOSITIONS

Date: March 20, 2001

Group Art Unit:

Examiner:

Asst. Commissioner for Patents

Washington, D.C. 20231

**AMENDMENT/SUBMISSION**

Prior to examination, please amend the application as follows.

**FEE CALCULATION**

Any additional fee required has been calculated as follows:

 If checked, "Small Entity" status is claimed.

NO. CLAIMS	HIGHEST NO.			ADDIT.	
AFTER	PREVIOUSLY				
AMENDMENT	PAID FOR	EXTRA PRESENT	RATE	FEE	
TOTAL 18	MINUS 20	* = 0	X (\$9 SE or \$18)	\$	
INDEP. 2	MINUS 3	** = 0	X (\$40 SE or \$80)	\$	
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM			X (\$135 SE or \$270)	\$	
TOTAL \$ -----					=====

\* not less than 20 \*\* not less than 3

If any additional payment is required, a check which includes the calculated fee of \$ \_\_\_\_\_  
 (OFGS Check No. \_\_\_\_\_) is attached.

In the event the actual fee is greater than the payment submitted or is inadvertently not enclosed or if any additional fee during the prosecution of this application is not paid, the Patent Office is authorized to charge the underpayment to Deposit Account No. 15-0700.

## **CONTINGENT EXTENSION REQUEST**

If this communication is filed after the shortened statutory time period had elapsed and no separate Petition is enclosed, the Commissioner of Patents and Trademarks is petitioned, under 37 C.F.R. §1.136(a), to extend the time for filing a response to the outstanding Office Action by the number of months which will avoid abandonment under 37 C.F.R. §1.135. The fee under 37 C.F.R. § 1.17 should be charged to our Deposit Account No. 15-0700.

## **AMENDMENTS**

X If checked, amendment(s) to the specification and/or claims are submitted herewith.

1.        If checked, an abstract is submitted as the last page of Appendix A.

### **3. Claims:**

Please amend claims 7-12, 14, 16 and 17 pursuant to 37 C.F.R. § 1.121(c)(i) as set forth in the “clean” version attached hereto as Appendix A. Entry is respectfully requested. A version with markings to show the changes made pursuant to 37 C.F.R. § 1.121(c)(ii) is attached hereto as Appendix B.

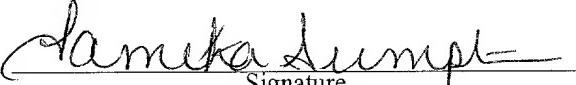
       If checked, the optional complete set of “clean” claims pursuant to 37 C.F.R. § 1.121(c)(3) is attached hereto as Appendix C.

## REMARKS/ARGUMENT

This Preliminary Amendment is submitted to change the multiple dependent claims to single dependent claims in order to reduce the government filing fee.

### EXPRESS MAIL CERTIFICATE

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Tamika Sumpter  
Name of Person Mailing Correspondence  
  
Signature  
March 20, 2001  
Date of Signature

Respectfully submitted,



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**APPENDIX A**  
**“CLEAN” VERSION OF EACH PARAGRAPH/SECTION/CLAIM**  
**37 C.F.R. § 1.121(b)(ii) AND (c)(i)**

**CLAIMS (with indication of amended or new):**

(Amended) 7. The fungicidal composition as claimed in claim 1, characterized in that it comprises, in addition, another fungicidal active material, in particular iprodione.

(Amended) 8. The fungicidal composition as claimed in claim 1, characterized in that the compound (I)/compound (II) ratio is chosen so as to produce a synergistic effect.

(Amended) 9. The fungicidal composition as claimed in claim 1, characterized in that the compound (I)/compound (II) ratio is between 10 and 0.01, preferably between 5 and 0.5.

(Amended) 10. The fungicidal composition as claimed in claim 1, characterized in that the compound (I)/compound (II) ratio is between 5 and 0.5.

(Amended) 11. The fungicidal composition as claimed in claim 1, characterized in that it comprises, besides compounds (I) and (II), an agriculturally suitable inert support and optionally an agriculturally suitable surfactant.

(Amended) 12. The fungicidal composition as claimed in claim 1, characterized in that it comprises from 0.5 to 99% of the combination of compound (I) and compound (II).

(Amended) 14. A process for curatively or preventively controlling the phytopathogenic fungi of crops, characterized in that an effective and non-phytotoxic amount of a fungicidal composition as claimed in claim 1 is applied onto the vegetation to be treated.

(Amended) 16. The process as claimed in claim 14, characterized in that the amount of fungicidal composition corresponds to a dose of compound (I) of between 10 and 500 g/ha, preferably between 20 and 300 g/ha.

(Amended) 17. The process as claimed in claim 14, characterized in that the amount of fungicidal composition corresponds to a dose of compound (II) of between 10 and 500 g/ha, preferably between 20 and 300 g/ha.

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**APPENDIX B**  
**VERSION WITH MARKINGS TO SHOW CHANGES MADE**  
**37 C.F.R. § 1.121(b)(iii) AND (c)(ii)**

**CLAIMS:**

7. The fungicidal composition as claimed in [one of claims 1 to 6] claim 1, characterized in that it comprises, in addition, another fungicidal active material, in particular iprodione.

8. The fungicidal composition as claimed in [one of claims 1 to 7] claim 1, characterized in that the compound (I)/compound (II) ratio is chosen so as to produce a synergistic effect.

9. The fungicidal composition as claimed in [one of claims 1 to 8] claim 1, characterized in that the compound (I)/compound (II) ratio is between 10 and 0.01, preferably between 5 and 0.5.

10. The fungicidal composition as claimed in [one of claims 1 to 9] claim 1, characterized in that the compound (I)/compound (II) ratio is between 5 and 0.5.

11. The fungicidal composition as claimed in [one of claims 1 to 10] claim 1, characterized in that it comprises, besides compounds (I) and (II), an agriculturally suitable inert support and optionally an agriculturally suitable surfactant.

12. The fungicidal composition as claimed in [one of claims 1 to 11] claim 1, characterized in that it comprises from 0.5 to 99% of the combination of compound (I) and compound (II).

14. A process for curatively or preventively controlling the phytopathogenic fungi of crops, characterized in that an effective and non-phytotoxic amount of a fungicidal composition as claimed in [one of claims 1 to 12] claim 1 is applied onto the vegetation to be treated.

16. The process as claimed in [either of claims 14 and 15] claim 14, characterized in that the amount of fungicidal composition corresponds to a dose of compound (I) of between 10 and 500 g/ha, preferably between 20 and 300 g/ha.

17. The process as claimed in [one of claims 14 to 16] claim 14, characterized in that the amount of fungicidal composition corresponds to a dose of compound (II) of between 10 and 500 g/ha, preferably between 20 and 300 g/ha.

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FUNGICIDAL COMPOSITIONS

The present invention relates to novel fungicidal compositions comprising a 2-imidazolin-5-one derivative and an amino acid amide derivative, which are intended in particular for protecting crops. The invention also relates to a process for protecting crops against fungal diseases.

Compounds derived from 2-imidazolin-5-ones with fungicidal action are known, in particular from European patent application EP 551,048, these compounds making it possible to prevent the growth and development of phytopathogenic fungi which attack or are liable to attack crops.

International patent application WO 96/03044 also discloses a certain number of fungicidal compositions comprising a 2-imidazolin-5-one in combination with one or more fungicidal active materials.

Patent applications EP-A-0,775,696 and EP-A-0,472,966 present novel compounds for fungicidal use which have an amino acid amide structure.

However, it is always desirable to improve the products which can be used by growers in order to control fungal diseases of crops, and in particular mildews.

It is also always desirable to reduce the doses of chemical products spread into the environment

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to control fungal attacks on crops, in particular by reducing the application doses of the products.

Lastly, it is always desirable to increase the number of antifungal products available to growers 5 in order for them to find, among these products, the one which is best suited to their specific use.

One aim of the invention is thus to provide a novel fungicidal composition which is useful for the problems outlined above.

10 Another aim of the invention is to propose a novel fungicidal composition which is useful in the preventive and curative treatment of fungal diseases, for example of Solanaceae plants and of grapevine.

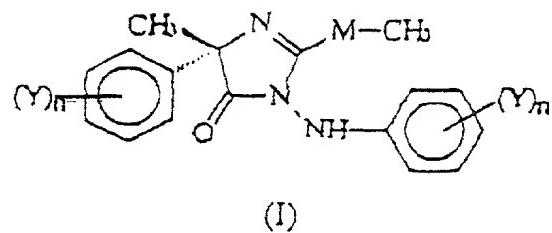
Another aim of the invention is to propose a 15 novel fungicidal composition which is of improved efficacy against mildew and/or Septoria leaf blotch in Solanaceae plants and grapevine.

Another aim of the invention is to propose a novel fungicidal composition which is of improved 20 efficacy against mildew and/or oidium and/or botrytis in grapevine.

It has now been found that these aims may be achieved, partly or totally, by means of the fungicidal compositions according to the present invention.

25 The subject of the present invention is thus, firstly, fungicidal compositions comprising a compound (I) of formula:

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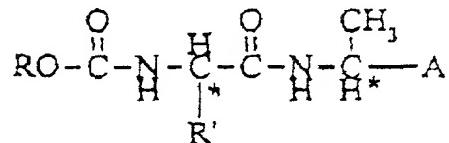


in which:

- 5 - M represents an oxygen or sulfur atom;
- n is an integer equal to 0 or 1;
- Y is a fluorine or chlorine atom or a methyl radical;

and a compound of formula (II):

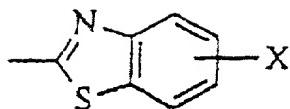
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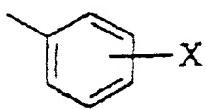
(II)

in which:

- R and R', which are identical or different, are chosen, independently of each other,
- 15 from a linear or branched alkyl radical containing from 1 to 6 carbon atoms,
- A represents a group chosen from A1 and A2 which have the respective formulae:



(A1)



(A2)

and

- X represents the hydrogen atom, a halogen atom chosen from chlorine, fluorine, bromine and iodine, a linear or branched alkyl radical containing from 1 to 6 carbon atoms, or a linear or branched alkoxy radical containing from 1 to 6 carbon atoms, and

- the asterisks represent asymmetric centers;  
the compound (I)/compound (II) ratio being  
10 between 50 and 0.01, preferably between 10 and 0.01 and  
even more preferably between 5 and 0.5.

The preferred compounds of formula (II) for the fungicidal compositions according to the invention are such that the asymmetric carbon center of the amino acid gives it the L configuration.

It is clearly understood that all the possible configurations of compound (II), i.e. all the isomers formed by the various configurations of the two asymmetric carbons, are included in the field of the present invention.

It is clearly understood that said fungicidal compositions can include a single compound (I) or more than one such compound and/or a single compound (II) or more than one such compound, as well as another

fungicidal compound, depending on the use for which they are intended.

The compositions according to the invention are advantageous for controlling, in particular, mildew 5 and Septoria leaf blotch in crops, such as cucumber or pea, for example, in Solanaceae plants, such as potato or tomato, as well as for controlling mildew in grapevine.

The compositions according to the invention 10 can also be used for controlling other phytopathogenic diseases of crops which are well known to the person skilled in the art who has at his or her disposal the compounds of formula (I) and of formula (II).

Compound (I) is known, in particular, from 15 patent application EP-A-0,629,616.

Compound (II), when A represents the group A1, and its use as a fungicide are described in particular in European patent application EP-A-0,775,696.

20 Compound (II), when A represents the group A2, and its use as a fungicide are described in particular in European patent application EP-A-0,472,996.

The compound (I)/compound (II) ratio is 25 defined as being the ratio of the weight of these 2 compounds. This is likewise the case for any ratio of 2 chemical compounds, mentioned hereinbelow in the

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present text, insofar as a definition different from this ratio is not expressly indicated.

These compositions generally appreciably improve the respective and isolated action of compound 5 (I) and of compound (II) for a certain number of fungi that are particularly harmful in crops, in particular for Solanaceae, more particularly for mildew in Solanaceae plants, while at the same time retaining an absence of phytotoxicity toward these crops. This 10 therefore results in an improvement in the spectrum of activity and a possibility of decreasing the respective dose of each active material used, the latter quality being particularly advantageous for readily appreciated ecological reasons.

15 The fungicidal compositions according to the invention for which:

- compound (I) is the compound of formula (I) in which M is a sulfur atom and n is equal to 0, also known as (4-S)-4-methyl-2-methylthio-4-phenyl-1-20 phenylamino-2-imidazolin-5-one, referred to hereinbelow as "Compound A", and

- compound (IIA) is the compound of formula (II) in which R represents the isopropyl radical, A represents the group (A1), X represents the fluorine 25 atom placed in position 6 on the 2-benzothiazolyl radical, the amino acid has the L configuration and the asymmetric carbon borne by the 2-benzothiazolyl

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radical, the R configuration, also known as N<sup>1</sup>-[(R)-1-(6-fluoro-2-benzothiazolyl)ethyl]-N<sup>2</sup>-isopropoxycarbonyl-L-valinamide, referred to hereinbelow as "Compound B", or alternatively

5 - compound (IIB) is the compound of formula (II) in which R represents the isopropyl radical, A represents the group (A2), X represents the methyl radical placed in position 4 on the phenyl radical, whether it is in the form of a racemate or mixtures of  
10 enantiomers and/or of diastereoisomers or in the form of a pure optical isomer, also known as isopropyl [2-methyl-1-(1-phenylethylcarbamoyl)-propyl]carbamate, referred to hereinbelow as "Compound C", are preferred.

A particularly advantageous form of compound  
15 (C) is the product commonly called Iprovalicarb.

In the compositions according to the invention, the compound (I)/compound (II) ratio is advantageously chosen so as to produce a synergistic effect. The term synergistic effect is understood to  
20 refer in particular to that defined by Colby S.R. in an article entitled "Calculation of the synergistic and antagonistic responses of herbicide combinations" published in the journal Weeds, 1967, 15, p. 20-22. The latter article uses the formula:

25 
$$E = X + Y - XY/100$$

in which E represents the expected percentage of inhibition of the disease for the combination of the

two fungicides at defined doses (for example equal to x and y respectively), X is the percentage of inhibition observed for the disease by the compound (I) at a defined dose (equal to x), Y is the percentage of inhibition observed for the disease by the compound (II) at a defined dose (equal to y). When the percentage of inhibition observed for the combination is greater than E, there is a synergistic effect.

The term "synergistic effect" also means the effect defined by application of the Tammes method, "Isoboles, a graphic representation of synergism in pesticides" Netherlands Journal of Plant Pathology, 70(1964), p. 73-80.

The compound (I)/compound (II) ratio ranges indicated above do not in any way limit the scope of the invention, but are, rather, mentioned as a guide, a person skilled in the art being entirely capable of carrying out additional tests to find other values of the ratio of doses of these two compounds, for which a synergistic effect is observed.

The compositions according to the invention, comprising compound (I) and compound (II), make it possible to observe entirely noteworthy synergistic properties.

According to one variant of the compositions according to the invention, the compound (I)/compound

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(II) ratio is advantageously between 10 and 0.01, preferably between 5 and 0.2.

In general, the compositions according to the invention have shown good results when the compound 5 (I)/compound (II) ratio is between 5 and 1.

Another subject of the invention is compositions comprising one or more combinations according to the invention as described above.

The invention also comprises processes for 10 treating plants against phytopathogenic diseases, characterized in that a combination of a compound of formula (I) and a compound of formula (II) is applied. It is also possible to apply a composition containing the two active materials, or, either simultaneously or 15 successively so as to have the conjugated effect, two compositions each containing one of the two active materials.

These compositions cover not only 20 compositions which are ready to be applied to the crop to be treated by means of a suitable device, such as a spraying device, but also commercial concentrated compositions which need to be diluted before they are applied onto the crop.

The present invention provides a method for 25 controlling a large variety of phytopathogenic diseases of crops, in particular for controlling Septoria leaf

blotch and mildew. These diseases can be controlled by direct application to the leaves.

The present invention thus provides a process for curatively or preventively controlling the 5 phytopathogenic diseases of crops, which comprises treatment of said crop (for example by application or by administration) with an effective and non-phytotoxic amount of a combination as defined above. The expression "treatment of the crop" means an application 10 or administration of a fungicidal composition as described above onto the aerial parts of the crops or onto the soil in which they are growing and which are infested or liable to become infested with a phytopathogenic disease, such as mildew or Septoria 15 leaf blotch, for example. The expression "treatment of the crop" also means treatment of the reproduction products of the crop, such as the seeds or the tubers, for example.

The compositions described below are used in 20 general for application onto growing vegetation, or onto areas in which crops are grown, or for the coating of or film-forming on the seeds.

Among the means which are suitable for applying the compounds of the invention, mention may be 25 made of the use of powders, foliar sprays, granules, mists or foams, or alternatively means in the form of suspensions of finely divided or encapsulated

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compositions; for the treatment of soils or roots with liquid imbibitions, powders, granules, fumes or foams; for application onto the plant seeds, the use, as agents for forming a film on or coating seeds, of 5 powders or liquid broths.

The compounds or compositions according to the invention are, appropriately, applied to the vegetation and in particular to the leaves infested with the phytopathogenic fungi. Another method for 10 applying the compounds or compositions according to the invention is to add a formulation containing the active material, with the irrigation water. This irrigation can be an irrigation using sprinklers.

The formulations which are suitable for the 15 applications of the compositions, according to the invention comprise formulations which are suitable for use in the form, for example, of sprays, powders, granules, mists, foams, emulsions or the like.

In practice, for controlling the 20 phytopathogenic diseases of crops, one method, for example, consists in applying an effective amount of a composition according to the invention onto the plants or onto the medium in which they are growing. For such a method, the active material is generally applied onto 25 the same area in which the infestation needs to be controlled, at an effective dose of between about 5 g and about 2 kg of active material per hectare of area

treated. Under ideal conditions, depending on the nature of the phytopathogenic fungus to be treated, a lower dose may offer adequate protection. Conversely, poor climatic conditions, resistance or other factors 5 may require higher doses of active material. The optimum dose usually depends on several factors, for example on the type of phytopathogenic fungus to be treated, on the type or level of development of the infested plant, on the density of vegetation, or 10 alternatively on the method of application. More preferably, an effective dose of active material is between about 20 g/ha and about 1000 g/ha.

For their use in practice, the compositions according to the invention can be used alone and can 15 also advantageously be used in compositions containing one or other of the active materials or alternatively both of them together, in combination or association with one or more other compatible components which are, for example, solid or liquid fillers or diluents, 20 adjuvants, surfactants or equivalents, which are suitable for the desired use and which are acceptable for uses in agriculture. The compositions can be of any type known in the sector which are suitable for application onto all types of plantations or crops. 25 These compositions, which can be prepared in any manner known in this sector, also form part of the invention.

The compositions can also contain ingredients of other types, such as protective colloids, adhesives, thickeners, thixotropic agents, penetrating agents, oils for spraying, stabilizers, preserving agents (in particular moldproofing agents), sequestering agents or the like, as well as other known active ingredients which have pesticidal properties (in particular fungicidal, insecticidal, acaricidal or nematicidal properties) or which have properties of regulating plant growth. More generally, the compounds used in the invention can be combined with any solid or liquid additives corresponding to the usual formulation techniques.

The effective working doses of the combinations used in the invention can vary within wide proportions, in particular depending on the nature of the phytopathogenic fungi to be eliminated or the degree of infestation, for example, of the plants with these fungi.

In general, the compositions according to the invention usually contain from about 0.05% to about 99% (by weight) of one or more compositions according to the invention, from about 1% to about 95% of one or more solid or liquid fillers and, optionally, from about 0.1% to about 50% of one or more other compatible compounds, such as surfactants or the like.

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In the present account, the term "filler" means an organic or inorganic, natural or synthetic component with which the active component is combined to facilitate its application, for example, onto the 5 plants, the seeds or the soil. This filler is consequently generally inert and it must be acceptable (for example acceptable for agronomic uses, in particular for treating plants).

The filler can be solid, for example clays, 10 natural or synthetic silicates, silica, resins, waxes, solid fertilizers (for example ammonium salts), natural soil minerals, such as kaolins, clays, talc, lime, quartz, attapulgite, montmorillonite, bentonite or diatomaceous earths, or synthetic minerals, such as 15 silica, alumina or silicates, in particular aluminum or magnesium silicates. The solid fillers which are suitable for granules are as follows: natural, crushed or broken rocks, such as calcite, marble, pumice, sepiolite or dolomite; synthetic granules of inorganic 20 or organic flours; granules of organic material such as sawdust, coconut shell, corn ear or envelope, or tobacco stem; kieselguhr, tricalcium phosphate, powdered cork or adsorbent carbon black; water-soluble polymers, resins, waxes; or solid fertilizers. Such 25 compositions can, if so desired, contain one or more compatible agents such as wetting agents, dispersing

agents, emulsifiers or dyes which, when they are solid, can also act as diluents.

The fillers can also be liquid, for example: water, alcohols, in particular butanol or glycol, as well as ethers or esters thereof, in particular methyl glycol acetate; ketones, in particular acetone, cyclohexanone, methyl ethyl ketone, methyl isobutyl ketone or isophorone; petroleum fractions such as paraffinic or aromatic hydrocarbons, in particular xlenes or alkynaphthalenes; mineral or plant oils; aliphatic chlorohydrocarbons, in particular trichloroethane or methylene chloride; aromatic chlorohydrocarbons, in particular chlorbenzenes; water-soluble or highly polar solvents such as dimethylformamide, dimethyl sulfoxide, N,N-dimethylacetamide or N-methylpyrrolidone; N-octylpyrrolidone, liquefied gases; or the like, whether they are taken separately or as a mixture.

The surfactant can be an emulsifier, a dispersing agent or a wetting agent, of ionic or nonionic type or a mixture of these surfactants. Among those surfactants which are used, for example, are polyacrylic acid salts, lignosulfonic acid salts, phenolsulfonic or naphthalenesulfonic acid salts, polycondensates of ethylene oxide with fatty alcohols or fatty acids or fatty esters or fatty amines, substituted phenols (in particular alkylphenols or

arylphenols), ester-salts of sulfosuccinic acid, taurine derivatives (in particular alkyl taurates), phosphoric esters of alcohols or of polycondensates of ethylene oxide with phenols, fatty acid esters with 5 polyols, or sulfate, sulfonate or phosphate functional derivatives of the compounds described above. The presence of at least one surfactant is generally essential when the active material and/or the inert filler are insoluble or only sparingly soluble in water 10 and when the filler for said composition to be applied is water.

The compositions according to the invention can also contain other additives such as adhesives or dyes. Adhesives such as carboxymethylcellulose, or 15 natural or synthetic polymers in the form of powders, granules or matrices, such as gum arabic, latex, polyvinylpyrrolidone, polyvinyl alcohol or polyvinyl acetate, natural phospholipids, such as cephalins or lecithins, or synthetic phospholipids can be used in 20 the formulations. It is possible to use dyes such as inorganic pigments, such as, for example: iron oxides, titanium oxides, Prussian blue; organic dyestuffs, such as those of the alizarin, azo or metal phthalocyanin type; or of trace elements such as iron, manganese, 25 boron, copper, cobalt, molybdenum or zinc salts.

The compositions containing the combinations of the invention, which are used to control the

phytopathogenic fungi of crops, can also contain stabilizers, other fungicidal agents, insecticides, acaricides, nematicides, anti-helminths or anti-coccidoses, bactericides, attractant or repellent agents or pheromones for arthropods or vertebrates, deodorizers, flavorings or dyes.

These stabilizers can be chosen for the purpose of improving the strength, the persistence, the safety, the spectrum of action on the phytopathogenic fungi of crops or to make the composition capable of accomplishing other useful functions for the areas treated.

By way of example, the compositions according to the invention may contain, in addition to a compound of formula (I) and a compound of formula (II), another active material possessing fungicidal properties.

Appropriately, the other fungicidal active material may be iprodione. Other fungicidal active materials may however be completely suitable without departing from the subject of the present invention.

Thus, when the other active material is iprodione, compositions which are completely appropriate are for example those containing compound (A), compound (B) and iprodione, or alternatively compound (A), compound (C) and iprodione.

For their use in agriculture, the combinations according to the invention are

consequently in the form of compositions which are in a variety of solid or liquid forms.

The solid forms of the compositions which can be used are pulverulent powders (with an amount of active material, combination according to the invention, ranging up to 99%), wettable powders or granules (including water-dispersible granules), and in particular those obtained by extrusion, compacting, impregnation on a filler or by granulation using a powder (the amount of active material, combination according to the invention, in these wettable granules or powders, being between about 0.5% and about 99%).  
The homogeneous or heterogeneous solid compositions containing a composition according to the invention, for example the granules, pellets, briquettes or capsules, can be used for treating stagnant or trickling waters over a relatively long period of time.

A similar effect can be obtained by using intermittent feeds or seepages of the water-dispersible concentrates as described later.

The liquid compositions comprise, for example, aqueous or non-aqueous solutions or suspensions (such as emulsifiable concentrates, emulsions, flowables, dispersions or solutions) or alternatively aerosols. The liquid compositions also comprise, in particular, emulsifiable concentrates, dispersions, emulsions, gels, flowables, aerosols,

wettable powders (or powders for spraying), dry flowables or dry pastes as liquid composition forms or as forms intended to form liquid compositions when they are applied, such as, for example, aqueous sprays  
5 (including those of low or ultra-low volume) or mists or aerosols.

The liquid compositions, for example in the form of soluble or emulsifiable concentrates, usually comprise from about 5 to about 95% by weight of active material, whereas the ready-to-use emulsions or  
10 solutions themselves contain from about 0.01 to 20% of active material. In addition to the solvent, the soluble or emulsifiable concentrates can contain, when necessary, from about 2 to about 50% of suitable  
15 additives, such as stabilizers, surfactants, penetrating agents, corrosion inhibitors, dyes or adhesives. Irrespective of their concentrations, the emulsions, which are particularly suitable for application onto plants, for example, can be obtained  
20 from these concentrates by dilution with water. These compositions are included in the field of compositions which can be used in the present invention. The emulsions can cover the forms of water-in-oil or oil-in-water type and they can be of thick consistency or  
25 even in gel form.

All these aqueous dispersions or emulsions or mixtures for spraying can be applied, for example, to

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vegetation by any suitable means, firstly by spraying,  
at doses which are generally from about 100 to about  
1 200 liters of mixture to be sprayed per hectare, but  
can be higher or lower (for example of low or ultra-low  
5 volume), depending on the need or the application  
technique.

The concentrated suspensions, which can be applied by spraying, are prepared so as to be in the form of a fluid, stable product which does not sediment  
10 (in the case of fine grains), generally containing from about 10 to about 75% by weight of active material, from about 0.5 to about 30% of surfactants, from about 0.1 to about 10% of rheological agents, from about 0 to about 30% of suitable additives, such as antifoaming  
15 agents, corrosion inhibitors, stabilizers, penetrating agents, adhesives and, as filler, water or an organic liquid in which the active material is insoluble or only sparingly soluble. Organic solids or inorganic salts can be dissolved in the filler in order to  
20 prevent any setting to a solid or to act as antifreeze for the water.

The wettable powders or soluble powders (powder for spraying) are generally prepared so as to contain from about 10 to about 100% by weight of active  
25 material, from about 0 to about 90% of solid filler, from about 0 to about 5% of a wetting agent, from about 0 to about 10% of a dispersant and, when necessary,

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from about 0 to about 80% of one or more stabilizers and/or other additives, such as penetrating agents, adhesives, anti-caking agents, dyes and the like. In order to obtain these wettable powders, the active material(s) is (are) intimately mixed in a suitable mixer with other additional substances which can be impregnated onto a porous support and is (are) ground in a mill or other suitable device designed for this purpose. This gives wettable powders whose wettability and suspension quality are very advantageous. They can be in suspension in water to give any type of concentration desired and this suspension can advantageously be used in particular for application to the leaves of plants.

The "water-dispersible granules" (WG) and the soluble granules (SG) have compositions which are substantially similar to those of the wettable powders. They can be prepared by granulation of the formulations described for the wettable powders, either according to a so-called wet-route process (by means of contact between the finely ground active material with the inert filler and a small amount of water, for example 1 to 20% by weight, or with an aqueous solution of a binder or a dispersing agent, followed by drying and screening), or according to a so-called dry-route process (grinding followed by compacting and screening) like those obtained by extrusion.

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The doses and concentrations of the compositions formulated can vary depending on the method of application or the nature of the compositions or depending on their use. In general, the formulated compositions usually contain from about 0.00001% to about 100%, more particularly from about 0.0005% to about 80%, by weight of at least one combination according to the invention, or of all of the active materials (i.e. a composition of the invention as a mixture with other pesticidal substances or stabilizers). In concrete terms, the compositions used and their working doses will be chosen so as to obtain the effect(s) desired by the farmer, horticulturalist, forester, any technical staff responsible for controlling the phytopathogenic fungi of crops or any other person qualified in this field.

The following formulations described in Examples A to I illustrate formulations which can be used in controlling the phytopathogenic fungi of crops, which comprise, as active material, one or more compositions according to the invention. The two-letter codes given in brackets after the names of the types of formulation are the international codes usually used for denoting these formulations. The formulations described in Examples A to I can each be diluted to give a composition for spraying at suitable concentrations for use in fields or on grapevines. The

general chemical descriptions of the components (for which all the following percentages are given on a weight basis) used in the formulations of Examples A to G and presented as examples below are as follows:

5

<u>Commercial name</u>	<u>Chemical description</u>
Igepal BC/10	Nonylphenol/ethylene oxide condensate
Soprophor BSU	Tristyrylphenol/ethylene oxide condensate
Arylan CA	70% weight/volume solution of calcium dodecylbenzenesulfonate
Solvesso 150	C <sub>10</sub> light aromatic solvent
Supragil WP	Alkyl naphthalenesulfonates
Darvan No2	Sodium lignosulfonate
Celite PF	Synthetic filler based on magnesium silicate
Sopropon T36	Sodium salts of polycarboxylic acids
Rhodopol 23	Xanthan gum polysaccharide
Bentone 38	Organic derivative of magnesium montmorillonite
Supragil MNS90	Condensate of alkyl naphthalenesulfonates
Rhodorsil	Silicone emulsion
Antifoam 432	
Aerosil	Microfine silicon dioxide

EXAMPLE A:

A water-soluble concentrate (SL) is prepared with the following composition:

	Active material	7%
5	Igepal BC/10	10%
	Water	83%

The active material is added to a solution of Igepal BC/10 dissolved in an amount of N-methylpyrrolidone with heating and stirring until 10 dissolved. The solution thus obtained is adjusted to the final volume by addition of the remaining solvent.

EXAMPLE B:

An emulsifiable concentrate (EC) is prepared with the following composition:

15	Active material	25% (max.)
	Soprophor BSU	10%
	Arylan CA	5%
	N-methylpyrrolidone	50%
	Solvesso 150	10%

20 The first three components are dissolved in the N-methylpyrrolidone; the Solvesso 150 is then added to adjust to the final volume.

EXAMPLE C:

A wettable powder (WP) is prepared with the 25 following composition:

Active material	40%
Supragil WP	2%

Supragil MNS90 5%

Celite PF 53%

The ingredients are mixed together and ground in a hammer mill until a powder whose particle size is 5 less than 50 microns is obtained.

EXAMPLE D:

A concentrated suspension formulation is prepared with the following composition:

	Active material	40.00%
10	IGEPAL BC/10	1.00%
	Sopropon T36	0.20%
	Propylene glycol	5.00%
	Rhodopol 23	0.15%
	Water	53.65%

15 The ingredients are intimately mixed and ground in a ball mill until an average particle size of less than 3 microns is obtained.

EXAMPLE E:

20 A water-dispersible granule (WG) is prepared with the following composition:

Active materials	80%
Darvan No 2	12%
Supragil MNS90	8%
Supragil WP	2%

25 The ingredients are mixed together, micronized in a fluid-energy mill and then granulated in a rotary granulator by spraying with water (up to

10%). The granules thus obtained are dried in a fluidized-bed dryer in order to remove the excess water.

EXAMPLE F:

5 A pulverulent powder (DP) is prepared with the following composition:

Active material 1 to 10%

Superfine talcum powder 99 to 90%

10 The ingredients are intimately mixed and then ground until a fine powder is obtained.

EXAMPLE G:

A wettable powder (WP) is prepared with the following composition:

Active material 50%

15 Igepal BC/10 5%

Aerosil 5%

Celite PF 40%

The Igepal BC/10 is adsorbed onto the Aerosil which is then mixed with the other ingredients and 20 ground in a hammer mill to give a wettable powder, which can be diluted with water down to a concentration of 0.001% to 2% by weight of active material and applied to an area infested with the phytopathogenic fungi of crops, which are to be destroyed by spraying.

25 The numerous formulations cited above are given by way of example and are not limited thereto. The person skilled in the art will be able to assess

the use of the appropriate type of formulation for the specific problem he or she has to solve. In general, the formulations of WG type (water-dispersible granules) are particularly suitable for treatment  
5 processes using the compositions according to the present invention.

The fungicidal compositions according to the invention usually contain from 0.5 to 95% of the combination of compound (I) and compound (II).

10 This may be the concentrated composition, that is to say the commercial product combining compound (I) and compound (II). It may also be the dilute composition ready to be applied to the crops to be treated. In the latter case, the dilution with water  
15 may be carried out either using a commercial concentrated composition containing compound (I) and compound (II) (this mixture is referred to as the "ready-to-use" mixture or "ready mix"), or using the mixture prepared at the time of use (known as the "tank  
20 mix") of two commercial concentrated compositions each containing compound (I) and compound (II).

Lastly, the subject of the invention is a process for curatively or preventively controlling the phytopathogenic fungi of crops, characterized in that  
25 an effective and non-phytotoxic amount of a fungicidal composition according to the invention is applied onto the vegetation to be treated.

The phytopathogenic fungi of crops which may be combated by this process are, in particular, those:

- of the group of oomycetes:

- of the genus *Phytophthora* such as

- 5 *Phytophthora infestans* (mildew of Solanaceae, in particular late blight of potato or tomato),  
- of the family of Peronosporaceae, in particular *Plasmopara viticola* (downy mildew of grapevine), *Plasmopara halstedii* (sunflower mildew),
- 10 *Pseudoperonospora sp* (in particular cucurbit mildew and downy mildew of hop), *Bremia lactucae* (mildew of lettuce), *Peronospora tabacinae* (downy mildew of tobacco) and *Peronospora parasitica* (downy mildew of cabbage), *Peronospora viciae* (downy mildew of pea) and
- 15 *Peronospora destructor* (downy mildew of onion);  
- of the group of adelomycetes:
- of the genus *Alternaria*, for example *Alternaria solani* (early blight of Solanaceae and in particular of tomato and potato),
- 20 - of the genus *Guignardia*, in particular *Guignardia bidwelli* (black rot of grapevine),  
- of the genus *Oidium*, for example powdery mildew of grapevine (*Uncinula necator*), oidium of leguminous crops, for example *Erysiphe polygoni*
- 25 (powdery mildew of Cruciferae), *Leveillula taurica*, *Erysiphe cichoracearum*, *Sphaerotheca fuliginea* (powdery mildew of cucurbits, of composites and of tomato),

*Erysiphe communis* (powdery mildew of beetroot and cabbage), *Erysiphe pisi* (powdery mildew of pea and alfalfa), *Erysiphe polypogon* (powdery mildew of bean and cucumber mildew), *Erysiphe umbelliferarum* (powdery mildew of umbellifera, in particular of carrot),  
5 *Sphaerotheca humuli* (hop mildew);  
- of the group of soil fungi:  
- of the genus *Pythium* sp.,  
- of the genus *Aphanomyces* sp., in particular  
10 *Aphanomyces euteiches* (white root rot in pea),  
*Aphanomyces cochlioides* (dry rot of beet).

The expression "are applied to the vegetation to be treated" is understood to mean, for the purposes of the present text, that the fungicidal compositions  
15 which form the subject of the invention may be applied by means of various treatment processes such as:

- spraying a liquid comprising one of said compositions onto the aerial parts of said vegetation,  
- dusting, incorporation of granules or  
20 powders into the soil, watering around said vegetation and, in the case of trees, injection or sprinkling,  
- coating of or formation of a film on seeds of said vegetation using a broth comprising one of said compositions.

25 The spraying of a liquid onto the aerial parts of the crops to be treated is the preferred treatment process.

The expression "effective and non-phytotoxic amount" is understood to refer to an amount of composition according to the invention which is sufficient to allow the control or destruction of the fungi present or liable to appear on the crops, this amount entailing no symptoms of phytotoxicity for said crops. Such an amount is liable to vary within a wide range depending on the fungus to be combated, the type of crop, the climatic conditions and the nature of the compound (II) included in the fungicidal composition according to the invention. This amount may be determined by systematic field trials, which are within the capabilities of those skilled in the art.

Under the usual conditions of agricultural practice, an amount of fungicidal composition according to the invention corresponding to a dose of compound (I) of between 10 and 500 g/ha, preferably between 20 and 300 g/ha, generally gives good results.

According to the invention, the amount of fungicidal composition advantageously corresponds to a dose of compound (II) of between 10 and 500 g/ha, preferably between 20 and 300 g/ha.

The examples which follow are given purely for the purposes of illustrating the invention and do not limit it in any way.

Although the invention has been described in terms of numerous preferred variants, a person skilled

in the art will appreciate that many modifications, substitutions, omissions and changes can be made without departing from the spirit of this invention. Thus, it is clearly understood that the scope of the 5 present invention is limited only by the scope of the following claims, as well as by their equivalents.

Example 1: Test of a composition against downy mildew of grapevine (preventive action) :

A composition comprising Compound A in the 10 form of a concentrated suspension (SC) at a dose of 500 g/l and a composition comprising Compound B in the form of a wettable powder at a dose of 100 g/kg are used.

A broth containing Compound A at a dose of 15 125 g/l and Compound B at a dose of 37.5 g/l (Compound A/Compound B ratio approximately equal to 3.33) is prepared. This broth is diluted with water and applied as a jet sprayed onto the aerial parts of grapevine plants at a rate of 600 to 1000 l/ha depending on the 20 degree of infestation.

This combination was studied against *Plasmopara viticola* on grapevine. The experimental procedure is described below.

Grapevine plants (var. Gamay) at the pre- 25 blossom stage (separate floral buds) are treated with the fungicidal compositions at the doses mentioned above. An artificial contamination on the vines located

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around the plots is carried out by inoculation with *Plasmopara viticola* two days after the treatment.

The treatment with the broth containing Compound A and Compound B is repeated every 10 days.

5           Eleven days after the 7th treatment, a grading is then carried out. This consists in visually estimating the frequency (i.e. the number expressed as a percentage) of bunches or leaves which bear mildew spots (i.e. which bear a recognizable sporulating 10 infection with a whitish down) and then, by comparison with an untreated contaminated control, in defining the practical percentage of efficacy according to the following formula :

$$\% \text{ practical efficacy} = \frac{100 \times (\text{control frequency} - \text{test frequency})}{\text{control frequency}}$$

15           The theoretical efficacy according to the Colby formula is calculated from the following formula:

(TE = theoretical efficacy; PE = practical efficacy)

$$\% \text{TE(A+B)} = \% \text{PE(A)} + \% \text{TE(B)} - (\% \text{PE(A)} \times \% \text{PE(B)}) / 100$$

20           In this test, the composition according to the invention showed a practical efficacy of 90.3%, whereas the theoretical efficacy, calculated by the Colby formula, gave a value of 75.0%.

25           This huge difference between practical efficacy and theoretical efficacy clearly shows a large synergistic effect between the two Compounds A and B.

Example 2: Test of a composition against downy mildew of grapevine (curative action):

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A composition comprising Compound A in the form of a concentrated suspension (SC) at a dose of 500 g/l and a composition comprising Compound B in the form of a wettable powder at a dose of 100 g/kg are used.

A composition containing Compound A at a dose of 0.6 ppm and Compound B at a dose of 0.3 ppm (Compound A/Compound B ratio equal to 2) is prepared.

This combination was studied against 10 *Plasmopara viticola* on grapevine. The experimental procedure is described below.

Eight-week-old grapevine plants (var. Chardonnay) are inoculated by spraying the underside of the leaves with an aqueous suspension containing 15 100,000 *Plasmopara viticola* spores/ml of inoculum. The plants are then placed in a controlled-environment cabinet at 20°C, 100% RH (relative humidity) for 24 hours and are then treated with the fungicidal compositions at the doses mentioned above (3 repetitions/dose). They are then put back in the controlled-environment cabinet at 20°C, 100% RH (relative humidity) for a total of 6 days. Two gradings are then carried out (the first at 5 days and the second 1 day later). This consists in estimating the 25 foliar area supporting a sporulating infection (recognizable by the whitish down) and, by comparison

with an untreated contaminated control, in defining the percentage efficacy according to the following formula:  
 $\% \text{ practical efficacy} = \frac{100 \times (\% \text{control contamination} - \% \text{test contamination})}{\% \text{ control contamination}}$

- The theoretical efficacy according to the  
 5 Colby formula is calculated from the following formula:  
 (TE = theoretical efficacy; PE = practical efficacy)  
 $\% \text{TE (A+B)} = \% \text{PE (A)} + \% \text{TE (B)} - (\% \text{PE (A)} \times \% \text{PE (B)}) / 100$

The following results are obtained:

10

Grading		
	5 days after treatment	6 days after treatment
Practical efficacy (PE %)	80	66.7
Theoretical efficacy (TE %)	52.8	39.3
Synergism (PE - TE)	27.2	27.4

Here also, strong synergism between compounds A and B is noted in this curative test on grapevine.

- Example 3: Test of a composition against late  
 15 blight of potato (preventive action):

The same composition as that described in the two previous examples is used (Compound A in the form of a concentrated suspension (SC) at a dose of 500 g/l and Compound B in the form of a wettable powder at a  
 20 dose of 100 g/kg).

A broth containing Compound A at a dose of 100 g/l and Compound B at a dose of 25 g/l (Compound A/Compound B ratio equal to 4) is prepared. This broth is diluted with water and applied by spraying the leaves at a rate of 450 liters of broth per hectare.

This combination was studied against *Phytophthora infestans* on potato. The experimental procedure is described below.

Potato plants (var. Up To Date) in rapid growth and before blossom are treated with the fungicidal compositions at the doses mentioned above. No artificial contamination is carried out, in order to leave the natural attack of the fungus *Phytophthora infestans* to develop.

The treatment with the broth containing Compound A and Compound B is repeated approximately every 7 days.

Six treatments are thus carried out and the gradings are then carried out. These consist in visually estimating the percentage of destruction of all the vegetation (foliage and stalk) by the mildew and, by comparison with an untreated contaminated control, in then defining the percentage of practical efficacy as described in the previous examples.

In parallel, the theoretical efficacy according to the Colby formula is calculated.

The following results are obtained:

(In this test the untreated (control) plants  
are 100% destroyed)

	Grading (days after treatment No. 6)		
	15 days	23 days	26 days
Practical efficacy	76.2	52.5	40
Theoretical efficacy	47.4	19.1	16.9
Synergism (PE-TE)	28.8	33.4	23.1

Here also, strong synergism between compounds  
5 A and B is noted in this preventive test on potato.

Example 4: Test of a composition against late  
blight of potato (curative action):

The same composition as that described in the  
three previous examples is used (Compound A in the form  
10 of a concentrated suspension (SC) at a dose of 500 g/l  
and Compound B in the form of a wettable powder at a  
dose of 100 g/kg).

A broth containing Compound A at a dose of  
150 g/l and Compound B at a dose of 37.5 g/l (Compound  
15 A/Compound B ratio equal to 4) is prepared. This broth  
is diluted with water and applied by spraying the  
leaves at a rate of 1000 liters of broth per hectare.

This combination was studied against *Phytophthora infestans* on potato. The experimental procedure is described below.

Potato plants (var. Sirtema) are taken  
 5 (10 plants per plot) and their foliage is inoculated with an aqueous suspension of *Phytophthora infestans* spores (35,000 spores/ml). The leaves are then bagged to allow the growth of the fungus. After 20 hours, the bags are removed and a single treatment with the  
 10 fungicidal compositions is carried out at the doses mentioned above.

Two gradings are then carried out 5 and 8 days after the treatment. These consist in visually estimating the percentage of destruction of all the vegetation  
 15 (foliage and stalk) by the mildew and, by comparison with an untreated contaminated control, in then defining the percentage of practical efficacy as described in the previous examples.

In parallel, the theoretical efficacy  
 20 according to the Colby formula is calculated.

The following results are obtained:

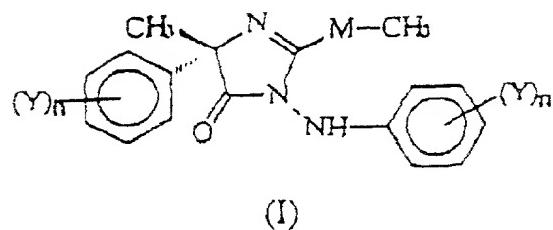
	Grading (days after treatment)	
	5 days	8 days
Control	88.4	90.3
Practical efficacy	66.1	62.3
Theoretical efficacy	44	42.6

Synergism (PE - TE)	22.1	19.7
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This preventive test on potato once again shows the synergism of the compositions according to the present invention.

## CLAIMS

1. A fungicidal composition comprising a compound (I) of formula:



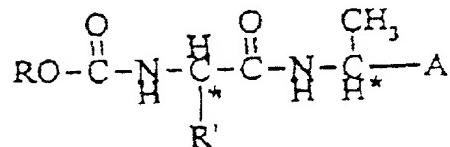
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in which:

- M represents an oxygen or sulfur atom;
- n is an integer equal to 0 or 1;
- Y is a fluorine or chlorine atom or a methyl radical;

10

and a compound of formula (II):



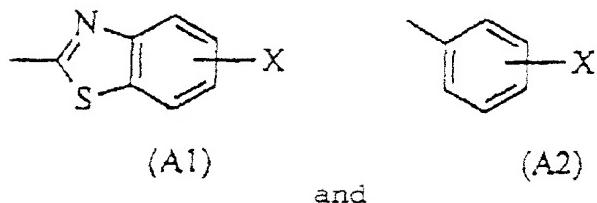
(II)

15

in which:

- R and R', which are identical or different, are chosen, independently of each other, from a linear or branched alkyl radical containing from 1 to 6 carbon atoms.

- A represents a group chosen from A1 and A2 which have the respective formulae:



5           - X represents a hydrogen atom, a halogen atom chosen from chlorine, fluorine, bromine and iodine, a linear or branched alkyl radical containing from 1 to 6 carbon atoms, or a linear or branched alkoxy radical containing from 1 to 6 carbon atoms, and

0           - the asterisks represent asymmetric centers; the compound (I)/compound (II) ratio being between 50 and 0.01, preferably between 10 and 0.01 and even more preferably between 5 and 0.5.

2. The fungicidal composition as claimed in  
15 claim 1, characterized in that compound (I) is (4-S)-4-  
methyl-2-methylthio-4-phenyl-1-phenylamino-2-  
imidazolin-5-one.

3. The fungicidal composition as claimed in  
claim 1, characterized in that compound (II) is N<sup>1</sup>-[(R)-  
20 1-(6-fluoro-2-benzothiazolyl)ethyl]-N<sup>2</sup>-isopropoxy-  
carbonyl-L-valinamide.

4. The fungicidal composition as claimed in  
claim 1, characterized in that compound (II) is  
isopropyl [2-methyl-1-(1-phenylethylcarbamoyl)propyl]-  
25 carbamate, in the form of a racemate, mixtures of

enantiomers and/or of diastereoisomers or a pure optical isomer.

5. The fungicidal composition as claimed in claim 1, characterized in that compound (I) is (4-S)-4-methyl-2-methylthio-4-phenyl-1-phenylamino-2-imidazolin-5-one and compound (II) is N<sup>1</sup>-[(R)-1-(6-fluoro-2-benzothiazolyl)ethyl]-N<sup>2</sup>-isopropoxycarbonyl-L-valinamide.

6. The fungicidal composition as claimed in 10 claim 1, characterized in that compound (I) is (4-S)-4-methyl-2-methylthio-4-phenyl-1-phenylamino-2-imidazolin-5-one and compound (II) is isopropyl [2-methyl-1-(1-phenylethylcarbamoyl)propyl] carbamate, in the form of a racemate, mixtures of enantiomers and/or 15 of diastereoisomers or a pure optical isomer.

7. The fungicidal composition as claimed in one of claims 1 to 6, characterized in that it comprises, in addition, another fungicidal active material, in particular iprodione.

20 8. The fungicidal composition as claimed in one of claims 1 to 7, characterized in that the compound (I)/compound (II) ratio is chosen so as to produce a synergistic effect.

9. The fungicidal composition as claimed in 25 one of claims 1 to 8, characterized in that the compound (I)/compound (II) ratio is between 10 and 0.01, preferably between 5 and 0.5.

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10. The fungicidal composition as claimed in one of claims 1 to 9, characterized in that the compound (I)/compound (II) ratio is between 5 and 0.5.

11. The fungicidal composition as claimed in  
5 one of claims 1 to 10, characterized in that it comprises, besides compounds (I) and (II), an agriculturally suitable inert support and optionally an agriculturally suitable surfactant.

12. The fungicidal composition as claimed in  
10 one of claims 1 to 11, characterized in that it comprises from 0.5 to 99% of the combination of compound (I) and compound (II).

13. A process for controlling the phytopathogenic fungi of crops in an area, which  
15 consists in applying a compound (I) and a compound (II) as defined in claim 1 to said area.

14. A process for curatively or preventively controlling the phytopathogenic fungi of crops, characterized in that an effective and non-phytotoxic  
20 amount of a fungicidal composition as claimed in one of claims 1 to 12 is applied onto the vegetation to be treated.

15. A process as claimed in claim 14,  
characterized in that the fungicidal composition is  
25 applied by spraying a liquid onto the aerial parts of the crops to be treated.

16. The process as claimed in either of claims 14 and 15, characterized in that the amount of fungicidal composition corresponds to a dose of compound (I) of between 10 and 500 g/ha, preferably 5 between 20 and 300 g/ha.

17. The process as claimed in one of claims 14 to 16, characterized in that the amount of fungicidal composition corresponds to a dose of compound (II) of between 10 and 500 g/ha, preferably 10 between 20 and 300 g/ha.

18. A product comprising a compound of formula (I) and a compound of formula (II) as a combined preparation for simultaneous, separate or sequential use in controlling the phytopathogenic fungi 15 of crops in an area.

USA 1998056

UNITED STATES OF AMERICA COMBINED DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION		OFGS FILE NO. P/3610-12								
<p>As a below named inventor, I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; that I verily believe that I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named) of the subject matter which is claimed and for which a patent is sought on the invention entitled:</p> <p><b>New fungicide compositions</b></p>										
<p>the specification of which is attached hereto, unless the following box is checked:</p> <p><input type="checkbox"/> was filed on <u>20 September 1999</u> as United States patent Application Number or PCT International patent application number <u>PCT/FR99/02223</u> and was amended on _____ (if any).</p>										
<p>I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.</p> <p>I acknowledge the duty to disclose all information known to be material to patentability in accordance with Title 37, Code of Federal Regulations, §1.56.</p> <p>I hereby claim priority benefits under Title 35, United States Code §119 of any foreign application(s) for patent or inventor's certificate or United States provisional application(s) listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:</p>										
<p>Prior Foreign or Provisional Application(s)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">COUNTRY</th> <th style="width: 35%;">APPLICATION NUMBER</th> <th style="width: 20%;">DATE OF FILING (day, month, year)</th> <th style="width: 20%;">PRIORITY CLAIMED UNDER 35 U.S.C. 119</th> </tr> </thead> <tbody> <tr> <td>France</td> <td>98/11895</td> <td>21 September 1998</td> <td>YES <input checked="" type="checkbox"/> NO _____</td> </tr> </tbody> </table>			COUNTRY	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 U.S.C. 119	France	98/11895	21 September 1998	YES <input checked="" type="checkbox"/> NO _____
COUNTRY	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 U.S.C. 119							
France	98/11895	21 September 1998	YES <input checked="" type="checkbox"/> NO _____							
<p>I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">UNITED STATES APPLICATION NUMBER</th> <th style="width: 33%;">DATE OF FILING (day, month, year)</th> <th style="width: 34%;">STATUS (patented, pending, abandoned)</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>			UNITED STATES APPLICATION NUMBER	DATE OF FILING (day, month, year)	STATUS (patented, pending, abandoned)					
UNITED STATES APPLICATION NUMBER	DATE OF FILING (day, month, year)	STATUS (patented, pending, abandoned)								
<p>I hereby appoint customer no. 2352 OSTROLENK, FABER, GERB &amp; SOFFEN, LLP, and the members of the firm, Samuel H. Weiner - Reg. No. 18,510; Jerome M. Berliner - Reg. No. 18,653; Robert C. Faber - Reg. No. 24,322; Edward A. Meilman - Reg. No. 24,735; Steven I. Weisburd - Reg. No. 27,409; Max Moskowitz - Reg. No. 30,576; Stephen A. Soffen - Reg. No. 31,063; James A. Finder - Reg. No. 30,173; William O. Gray, III - Reg. No. 30,944; Louis C. Dujmich - Reg. No. 30,625; Douglas A. Miro - Reg. No. 31,643, and Michael J. Scheer - Reg. No. 34,425, as attorneys with full power of substitution and revocation to prosecute this application, to transact all business in the Patent &amp; Trademark Office connected therewith and to receive all correspondence.</p>										
<p>SEND CORRESPONDENCE TO: <b>OSTROLENK, FABER, GERB &amp; SOFFEN, LLP</b> DIRECT TELEPHONE CALLS TO:  <u>1180 AVENUE OF THE AMERICAS</u> (212) 382-0700  <u>NEW YORK NEW YORK 10036-8403</u>  CUSTOMER NO. 2352</p>										
<p>I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.</p>										
<p>FULL NAME OF SOLE OR FIRST INVENTOR <u>Maurice CHAZALET</u></p>		<p>INVENTOR'S SIGNATURE <i>M. Chazal</i></p>								
<p>RESIDENCE (City and either State or Foreign Country) <u>F-69480 ANSE, France</u></p>		<p>COUNTRY OF CITIZENSHIP <u>France</u></p>								
<p>POST OFFICE ADDRESS <u>Le Mont Lucenay, F-69480 Anse, France</u></p>										
<p>FULL NAME OF SECOND JOINT INVENTOR (IF ANY) <u>Patrice DUVERT</u></p>		<p>INVENTOR'S SIGNATURE <i>P. Duvert</i></p>								
<p>RESIDENCE (City and either State or Foreign Country) <u>F-69004 LYON, France</u></p>		<p>COUNTRY OF CITIZENSHIP <u>France</u></p>								
<p>POST OFFICE ADDRESS <u>74, quai Gillet, F-69004 Lyon, France</u></p>										
<p>FULL NAME OF THIRD JOINT INVENTOR (IF ANY) <u>Jean-Marie GOUOT</u></p>		<p>INVENTOR'S SIGNATURE <i>J. Gouot</i></p>								
<p>RESIDENCE (City and either State or Foreign Country) <u>F-69450 SAINT CYR AU MONT D'OR, France</u></p>		<p>COUNTRY OF CITIZENSHIP <u>France</u></p>								
<p>POST OFFICE ADDRESS <u>24, allee des Eglantiers, F-69450 SAINT CYR AU MONT D'OR, France</u></p>										

CONTINUED ON PAGE 2



PATENT APPLICATION ASSIGNMENT -  
SOLE OR JOINT INVENTORS  
EXECUTED OUTSIDE U.S.A.

OFGS FILE NO. P/3610-12

WHEREAS, I (We), Maurice CHAZALET, Patrice DUVERT, Jean-Marie GOUOT and Richard MERCER as assignor(s), have invented certain improvements in  
New fungicide compositions for  
which an application for United States Letters Patent has been executed by me (us) of even date herewith; and

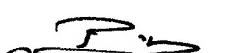
WHEREAS, AVENTIS CropScience SA, a corporation organized and existing under the laws of France, located at 55, avenue René Cassin, F-69009 Lyon, France, as assignee, is desirous of acquiring all right, title and interest in and to said invention and any Patent that may be granted therefor.

NOW, THEREFORE, in consideration of One Dollar (\$1.00) and other good and valuable consideration, the receipt of which is hereby acknowledged, I (We), as assignor(s), hereby sell, assign and set over to said assignee the entire right, title and interest for the United States and all other countries in and to said invention and the aforesaid application for Patent, all original, divisional, continuation, substitute or reissue applications and patents applied for or granted therefor in the United States and all other countries, including all rights of priority from the filing of said application, and all rights for past infringement, and the Commissioner of Patents and Trademarks is hereby authorized and requested to issue all patents on said inventions or resulting therefrom to said assignee herein, as assignee of the entire interest therein; and the undersigned for myself (ourselves) and my (our) legal representatives, heirs and assigns do hereby agree and covenant without further remuneration, to execute and deliver all divisional, continuation, reissue and other applications for Patent on said inventions and all assignments thereof to said assignee or its assigns, to communicate to said assignee or its representatives all facts known to the undersigned respecting said inventions, whenever requested, to testify in any interferences or other legal proceedings in which any of said applications or patents may become involved, to sign all lawful papers, make all rightful oaths, and to do generally everything necessary to assist assignee, its successors, assigns and nominees to obtain patent protection for said invention in the United States and all other countries, the expenses incident to said applications to be borne and paid by said assignee.

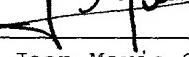
Date: 20/03/2001

  
Maurice CHAZALET

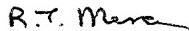
Date: March 16<sup>th</sup> 2001

  
Patrice DUVERT

Date: March 15<sup>th</sup>, 2001

  
Jean-Marie GOUOT

Date: 15-03-01

  
Richard MERCER

LEGALIZATION RECOMMENDED